

III SEMESTER, M.Sc. IN ENVIRONMENTAL SCIENCE
OPEN BOOK EXAMINATION, SEPTEMBER/OCTOBER 2020
ES 3.1: WATER AND WASTEWATER TREATMENT

Time: 3 Hours

Max. Marks: 80

Instruction: Answer all the sections.

Section A

Answer any **FOUR** questions from the following

4 × 5 = 20

1. With one or two sentences explain how precipitation occurs. Explain briefly the cyclonic precipitation.
2. Explain with a neat sketch, the Jack Well receiving water from number of infiltration wells.
3. With sketches, explain the following:
 - a) Flexible Joint
 - b) Flanged Joint
4. List various objectives of wastewater treatment.
5. Explain the term flocculent settling and hindered settling as applied to settling of suspended particle in wastewater treatment.
6. Write a brief note on thickening of sludge as applied to wastewater treatment.

Section B

Answer any **THREE** questions from the following

3 × 10 = 30

7. With a sketch discuss the cavity type of tube well.
8. Ketch the hand operated reciprocating pump and lable the parts. Also write the advantages and disadvantages of reciprocating pump.
9. List the various methods of laying water distribution system. Explain any two methods.
10. Enumerate the types of disposal of sewage in rural and urban areas and discuss briefly any two methods.
11. Explain the following:
 - a) Classification of screens used in wastewater treatment
 - b) Basic mechanisms involved in trickling filter.

Section C

Answer any **TWO** questions from the following

2 × 15 = 30

12. Enumerate the various types of pumps used in pumping the drinking water from source to distribution system. Explain the principle on which centrifugal pump works, also write the characteristics of centrifugal pump.
13. Discuss in detail the method of distribution of water by gravity system and combined gravity and pumping system.
14. Write the treatment flow sheet of conventional urban wastewater treatment. Explain the basic mechanisms involved in activated sludge process. Also discuss the merits and demerits of ASP.
15. Write a detailed note on:
 - a) Centrifugal thickening of sludge
 - b) Flotation thickening of sludge.

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OPEN BOOK EXAMINATION, SEPTEMBER/OCTOBER 2020

ES 3.2: APPLICATION OF REMOTE SENSING AND GIS IN ENVIRONMENTAL MONITORING

Time: 3 Hours

Max. Marks: 80

Instruction: Answer all the sections.

Section A

Answer any **FOUR** questions from the following **4 × 5 = 20**

1. Explain the characteristics of electro-magnetic radiation.
2. What is mosaic? Explain its types.
3. Discuss the use of digital image processing in remote sensing applications.
4. Explain hyperspectral image.
5. What is texture analysis? Explain.
6. Explain the topology model in GIS.

Section B

Answer any **THREE** questions from the following **3 × 10 = 30**

7. Define absorption, scattering and reflectance and explain their significances.
8. Discuss the various types of remote sensing.
9. What is platform? Explain the various types of platforms.
10. Explain the uses of remote sensing in forest application.
11. Discuss the integrated analytical function of GIS.

Section C

Answer any **TWO** questions from the following **2 × 15 = 30**

12. Discuss basic concepts of aerial photography.
13. Describe various methods of image interpretation.
14. Write a note on the role of remote sensing in disaster management.
15. Explain in detail the types of spatial data layers.

III SEMESTER, M.Sc. IN ENVIRONMENTAL SCIENCE
OPEN BOOK EXAMINATION, SEPTEMBER/OCTOBER 2020
ES 3.3: ENVIRONMENTAL IMPACT ASSESSMENT

Time: 3 Hours

Max. Marks: 80

***Instruction:** Answer all the sections.*

Section A

Answer any **FOUR** questions from the following **4 × 5 = 20**

1. Explain the EIA and EIS relationship with a flow sheet.
2. How do you categorize the industries as per MOEF?
3. Explain Delphi Technique in EIA.
4. Why environmental cost-benefit analysis is required. Explain.
5. Discuss briefly mitigation measures on air environment.
6. Explain the role of stakeholder's involvement in EIA process.

Section B

Answer any **THREE** questions from the following **3 × 10 = 30**

7. Explain the role of impact assessment in CPCB, SPCB & MOEF.
8. Write brief notes in the following:
 - a) Guidelines for evaluating impacts of LC projects.
 - b) Assessment of impacts of traffic and transportation.
9. With a case study, explain the environmental audit for a sugar factory.
10. Explain the various steps of environmental clearance.
11. With schematic diagram, discuss the waste audit procedure.

Section C

Answer any **TWO** questions from the following **2 × 15 = 30**

12. Explain the SWOT analysis for identifying strategic direction for an organization.
13. Write brief notes on various EIA methodologies.
14. Explain the air, water and land attributes in EIA analysis.
15. With a case study, discuss the EIA of a sea water reverse osmosis desalination plant.

III SEMESTER, M.Sc. IN ENVIRONMENTAL SCIENCE
OPEN BOOK EXAMINATION, SEPTEMBER/OCTOBER 2020
ES 3.4A: ENVIRONMENTAL STATISTICS AND COMPUTER APPLICATIONS
(ELECTIVE I)

Time: 3 Hours

Max. Marks: 80

Instruction: Answer all the sections.

Section A

Answer any **FOUR** questions from the following **4 × 5 = 20**

1. Define the basic sampling methods.
2. What are the common methods of descriptive analysis of quantitative data?
3. What is computer software and explain its types.
4. Mention the properties of normal distribution and explain the importance of normal distribution.
5. Compute the mean and median of the data: 9, 13, 5, 20, 15, 14, 13, 11, 23.
6. Describe the functions of MS-Excel.

Section B

Answer any **THREE** questions from the following **3 × 10 = 30**

7. What is data life cycle? Illustrate it with its schematic representation.
8. Discuss the advantages and disadvantages of using computer.
9. What is chi-square test? Mention its applications with basic steps.
10. What is correlation? Write the properties of correlation coefficient. Explain the correlation coefficient through scatter plot.
11. What is an F test? Discuss its application in testing whether the two variances are homogenous.

Section C

Answer any **TWO** questions from the following **2 × 15 = 30**

12. Write short notes on the following:
 - a) Probability sampling and non-probability sampling
 - b) Cluster and area sampling
 - c) Stratified sampling and random sampling
13. Write a note on the following:
 - a) Primary data and secondary data
 - b) Data base management system (DBMS).

14. What is normal distribution? Mention its characteristic features and write general procedure.

15. Analyze the following data using one way analysis of variance (ANOVA):

(Table value: $F_{(4,20)} = 2.87$ at 5% level of significance)

Treatments	R ₁	R ₂	R ₃	R ₄	R ₅
T ₁	1	0	5	1	0
T ₂	2	1	3	3	3
T ₃	4	2	1	1	0
T ₄	0	5	5	2	1
T ₅	3	6	7	5	6

III SEMESTER, M.Sc. IN ENVIRONMENTAL SCIENCE
OPEN BOOK EXAMINATION, SEPTEMBER/OCTOBER 2020
ES 3.4B: OCCUPATIONAL HEALTH AND SAFETY (ELECTIVE II)

Time: 3 Hours

Max. Marks: 80

Instruction: Answer all the sections.

Section A

Answer any **FOUR** questions from the following **4 × 5 = 20**

1. Discuss briefly the major goals of clean Air Act was amended in 1990.
2. Define hazard. With examples explain how it can be controlled at workplace.
3. Explain briefly the roles and responsibilities of emergency plan generally adopted in industries.
4. Explain PPE and its requirement at workplace.
5. Write the main objectives of the Factory Act. Discuss.
6. Briefly discuss the different accident causation theories.

Section B

Answer any **THREE** questions from the following **3 × 10 = 30**

7. State and explain the goals and principles of ergonomics.
8. With an example explain the structure of accidents in any industry.
9. Describe in detail the six cognitive guidelines on safety information.
10. Discuss briefly how the risk of injury to individual can be analyzed?
11. Explain in detail, the factors associated with physical stress.

Section C

Answer any **TWO** questions from the following **2 × 15 = 30**

12. Discuss in detail, the preventive methods to be adopted during toxic gases explosion. Explain the Bhopal gas tragedy.
13. Enumerate the five leading causes of accidental death of humans between the ages of 25 and 44. Discuss.
14. With a flow chart, explain the human error analysis.
15. Discuss in detail the risk of exposure of Hydrogen Sulphide on workers in various industries.
